IN THIS ISSUE:

Note from the Editor ............................................... P. 2
By Matthew Koenig, MD

President's Column ................................................. P. 3
By Romergryko Geocadin, MD

PRINCE Study Results at Annual Meeting ............... P. 4
By Jose Suarez, MD

NCS Large Hemispheric Stroke Guideline ............... P. 5
By Michel Torbey, MD

NCS Research Fellowship Program ....................... P. 6
By Jose Suarez, MD

NCS OnDemand Launches on Website ..................... P. 7
By Claude Hemphill, MD

Introduction of New NCS Member Rates ................ P. 8
By Gretchen Brophy, PharmD

Third NCS Research Conference ......................... P. 9-10
By Jose Suarez, MD

ENLS Course at 2015 SCCM Congress ..................... P. 11
By Wade Smith, MD

NCS Twitter Journal Club Coming Soon ................. P. 12
By Abhay Kumar, MD

Cranioplasty and the Dead Donor Rule ................. P. 13
By Edward Collins, ACNP

NCS Media Expert Speakers Bureau ..................... P. 14
By Tamer Abdelhak, MD

New AHA Research Grant Opportunities ................. P. 15
By Robert Kowalski, MD

Research during Fellowship ................................. P. 16
By Saef Izzy, MD

Pharmacy Committee Updates ............................ P. 17
By Theresa Human, PharmD

ENLS for Neurocritical Care Nurses ..................... P. 18
By Cynthia Bautista, RN

Neurocritical Care in Brazil .................................. P. 19
By Gisele Sampaio Silva, MD

Neurocritical Care News Briefs ............................ P. 20
By Gretchen Brophy, PharmD

Coming Up in Neurocritical Care ......................... P. 21
By Eelco Wijdicks, MD

Journal Watch ..................................................... P. 22-23
By Susanne Muehlschlegel, MD

TRAUMAMEDIC website ...................................... P. 23
By Susanne Muehlschlegel, MD

University of Rochester Neuro ICU ......................... P. 24-25
By Christopher Montanaro, PA-C

Classified Section ............................................... P. 26-28
Note From the Editor

Colleagues:

I want to welcome you to the last issue of Currents in 2014, the official quarterly news magazine of the NCS. This issue is packed with articles focusing on the continued growth of the NCS, including the launch of NCS OnDemand – the society’s opening salvo into on-line publishing – and the publication of two new NCS-sponsored guidelines on multimodality neuromonitoring and treatment of patients with large hemispheric strokes.

This year also marks my first year as chair of the NCS Communications Committee, which oversees all NCS media and communications with our members, including Currents, the NCS website, Facebook, Twitter, and most email communications. When Claude Hemphill asked me to chair the committee, I could not have foreseen how much work would be involved in setting up the committee, updating the website, and streamlining communications between the society and its members.

The lion’s share of work on the Communications Committee has focused on updating the website and creating a workflow in order to ensure that the content on the website continues to be updated on an ongoing basis to ensure that the website accurately depicts the activity of the society and its committees. If you haven’t visited the website recently, I want to invite every member to go back and explore the site content. I think you will find a lot of useful and timely information, including links to all of the NCS guidelines, updated committee rosters and contact information for committees, links to the archives of Currents and the NEWS, updated information on maintenance of certification in Neurology, and highlights from the NCS Annual Meeting.

As an NCS committee chair, I got to attend the inaugural meeting of the NCS monthly committee chairs teleconference. This meeting is intended to ensure that the chairs of the various NCS committees have regular communications about the activities of their committees in order to more effectively coordinate our efforts and align with the strategic plans and mission of the society. One of the expected benefits of this meeting will be to assign a member of each committee to act as a communications liaison through which the activities of each committee can be broadcasted more effectively through the website and other NCS communications.

NCS committee chairs were also asked to recommend a co-chair to help with the work of the committee and create a succession plan after the chair rotates off. The society has been focused on ensuring regular turnover of committee chairs and members in order to make the committees more accessible to interested members. The NCS officers have targeted a two-year term for committee chairs with the potential for reappointment. I am happy to announce that Huy Tran, MD has agreed to co-chair the Communications Committee. Huy is a neurointensivist at the University of New Mexico. In addition to his neurocritical care experience, Huy has an extensive background in web design so he brings a much needed skill set to the committee. I met Huy at the NCS Annual Meeting. He told me he programmed with Drupal – the NCS website’s open source platform and the source of many headaches – as a hobby, so I told him he was hired.

Speaking of Drupal-related headaches, all of you should have gotten an email from the NCS regarding a potential security breach that potentially affects all Drupal-based websites. In the worst case scenario, all of our member’s NCS user names and passwords and email addresses could have been stolen. The list of Drupal users is very extensive, including several large government bodies, so this was not a targeted attack on NCS per se. Our IT support company did an assessment of our website and found no evidence of an actual security breach. Also, the NCS never stores any financial information from our members so that information could not be accessed even if a breach did occur. Regardless, this is a reminder that no information stored on the internet is truly secure. If you have not already done so, please visit the NCS website and change your password. As a reminder, your NCS password should be unique and should not overlap with passwords you use for on-line banking or other secure sites.

Regarding the NCS website, this month marks the launch of the new NCS OnDemand section of our site. NCS OnDemand will provide members with access to on-line NCS publications, starting with all of the content from the 2014 NCS Annual Meeting. For meeting attendees, NCS OnDemand will include free access to videos of all of the presentations as well as the speakers slide sets. Non-members can also access this content for a fee. The second NCS OnDemand product will be access to the NCS Brain Death Toolkit. This extensive document includes FAQs for the public and medical providers regarding brain death declaration, a sample brain death policy for hospitals, videos demonstrating the process of brain death declaration, and links to current guidelines.

I hope you enjoy this issue. As always, if you have suggestions on improving Currents or want to contribute, please email me at mkoenig95@gmail.com. I’m also on the lookout for future Currents cover artwork, so send me artwork that you would like to see proudly displayed on an upcoming issue.

On the Cover: The cover art for this issue was taken by the founding past president of the NCS, Tom Bleck, MD. Tom says that this picture was from a trip after a critical care conference in Athens in 2011. The picture was taken in Nafplion, which was the original capital of Greece after the revolution against Turkish rule. The castle in the picture is called Bourtzi.

Cheers,

Matthew Koenig, MD, FNCS
Editor-in-Chief
Priorities for the Neurocritical Care Society in 2015

Romerykyo G. Geocadin, MD, FNCS

When I first joined the NCS fresh out of fellowship training, it never occurred to me that one day I would be the president of the society. But amazing things happened and I got engaged and I found many senior members who mentored me through the leadership ranks of the society. I found myself in a subspecialty that was just starting to grow. It also meant that I needed to do my share in making sure that neurocritical care thrives. I was lucky to have the opportunity to contribute in some areas, especially the creation of Currents and the NCS website.

With what started from the enthusiasm of a few and very little resources, the NCS has grown to what it is today. Sometimes the rapid growth and all the projects have a tendency to distract us from the important things that made the NCS a success. Now, as President, I would like to focus this year on simple but critical ideas that made NCS a ‘home’ to many of us, while maintaining the opportunities to deliver on our missions.

The NCS as Our Home: The smallness of the NCS during the first few years allowed almost everyone to be engaged directly with something in the society. The size of the society at this stage is perceived as a limitation to this but we have to find ways to get ourselves engaged with the NCS. The leadership has taken extra efforts to restructure the committees to allow member turnovers so everyone who desires to be engaged will get a chance to serve. At this stage, we have over 20 committees and working groups. We have also taken the step to mentor junior members in research and in leadership in the NCS and we have created avenues for these early career members to be part of the working groups.

The NCS has also grown internationally, now with members in over 50 countries, but the vast majority of members serving or leading committees are based in North America. This year, we have required that each committee have at least two members that are based outside of North America. This will not only expand membership involvement but will also lend a more global and younger outlook to committee memberships and activities. I would also like to find ways to enhance the multiprofessional and multispecialty environment in the big tent of the NCS.

Member and Sponsor Engagement: The NCS comes alive around the Annual Meeting but we know that our lives as health care providers continue during all 12 months of the year. We have to devise ways to continue the enthusiasm and activity between Annual Meetings. This year, we have initiated activities that will allow our members and sponsors to engage with the NCS year round. The Fundraising Committee, headed by Panos Varelas and Arash Afshinnik – with input from the Finance Committee – have developed sponsorship programs that will allow our supporters to engage with us over the months between Annual Meetings. The committees have also been encouraged to undertake year round activities to keep their members engaged.

Effective Communication: As the society gets larger, the need for more effective communication gets more critical. So, we have to look at how we communicate internally and externally. Internally, we have started regular monthly meetings between the committee chairs and the officers so we know what each committee is undertaking. This will allow the committees to collaborate more and share resources for similar activities.

We also have to harness and improve our existing communication tools. In this light, the Communication Committee, headed by Matt Koenig and Huy Tran, is undertaking a thorough review of the society’s communication tools and possibly a total revamp of our existing website. We have also restructured the committees to have a designated communication liaison so that committee activities are reported back to NCS members via the website and news magazine. Matt and Huy are also exploring novel ways to use social media and improve the way we communicate. Stay tuned for the "Twitter Journal club".

Enhance our Educational Mission: The largest and most impactful activity we have is education. We have to develop programs that will enhance our ability to educate our members, colleagues in other healthcare specialties, and patients with their families. We have achieved some success with this through our Annual Meeting, but we have to create other avenues to sustain our educational activities. We have restructured the Publication Committee into the Educational Products Committee, headed by Alejandro Rabinstein and Wade Smith, to oversee the production, collection, and distribution of NCS educational products.

In achieving this goal, we have created NCS OnDemand, which serves as the web portal for NCS educational products. For the launching of NCS OnDemand, we are providing the web-based presentations from the plenary sessions and workshops from the recent Annual Meeting in Seattle. Soon, we will be providing the latest edition of the Neurocritical Care Practice Update e-book edited by Claude Hemphill, Alejandro Rabinstein, and Owen Samuels.

Continued on page 10
The PRINCE Study has been completed successfully and the initial results were presented during the NCS Annual Meeting in Seattle. PRINCE (Point Prevalence Study in Neurocritical Care) was a cross-sectional, observational, non-interventional, multi-center, and international study. PRINCE was an unfunded study supported by NCS and Neurocritical Care Research Network (NCRN). PRINCE was the first study aimed at delineating the scope of practice of neurocritical care practitioners all over the world.

Objectives

PRINCE had three main objectives as follows:

- Try to delineate what neurointensivists/intensivists do in their daily practice when caring for neurocritically ill patients
- Perform a cross-sectional observational study using a variety of international sites
- Discern potential areas for research in neurocritical care

Hypotheses

PRINCE Investigators proposed three main hypotheses:

- The scope of practice of neurointensivists includes a variety of neurocritical care diseases.
- The scope of practice of neurointensivists varies within regions in the U.S. and between countries.
- The scope of practice of neurointensivists varies according to type of hospital setting (i.e., academic versus community-based).

Study Design

Investigators and participating sites registered four months prior to data collection. All patient-specific data were de-identified and all participating sites were required to obtain IRB/Ethics approval at their respective institutions utilizing the approved template application from the Baylor College of Medicine.

The set date for initiation of data collection was July 21, 2014. Participating investigators entered information regarding activities performed in the ICU/Neuro ICU on all admissions on the opening study day. Subsequently, investigators collected data on specific care activities they performed on the subjects during their first seven days of admission or discharge (whichever came first) to the ICU/Neuro ICU. Whenever possible, all the outcome measures used were validated in the neurological literature and accepted by the NINDS as part of the Common Data Elements (CDE) project.

There were six Case Report Forms (CRF) which were available for download and for electronic data entry in the PRINCE database. The latter was built using the REDcap Project software free of charge (http://www.project-redcap.org/).

Time Commitment

PRINCE required a substantial amount of time from the organizing team and we feel that, for the sake of transparency, it is important to disclose this information here. Of note, the time reported below is up to September 21, 2014:

- Study design: 44 hours
- CRF design and revision: 54 hours
- Initial waiver of consent application: 12 hours
- Face-to-face meeting in Charleston, SC: 48 hours
- Information technology time: 175 hours
- Legal and regulatory: 12 Data Use Agreements (DUA): 96 hours
- E-mails: 8,626 (100% reply rate): 287 hours
- Translation to Spanish and French: 36 hours
- Data Analysis: 25 hours (but more to come)
- Total estimated: 777 hours (97 work days)

Preliminary Results

A total of 263 international sites from 47 countries registered for participation in PRINCE and entered data on 1,444 subjects. The top countries included the U.S. (44.9%), India (7.8%), Spain (3.9%), and Argentina (3.9%). Most participating ICUs/Neuro ICUs were located in large academic medical centers. The most common diagnoses include traumatic brain injury, subarachnoid hemorrhage, intracerebral hemorrhage, ischemic stroke, status epilepticus, and anoxic brain injury.

We are currently in the process of auditing and cleaning the data fields. In addition, we are preparing several manuscripts for submission for peer review and publication very soon.

Conclusions

We conclude that a multicenter International Observational Study in neurocritical care is feasible and that PRINCE will allow us to understand the scope of practice of neurocritical care better. In addition, we have learned that most participating sites are located in large metropolitan areas and that traumatic brain injury, subarachnoid hemorrhage, and intracerebral hemorrhage were the most common primary diagnoses.

Acknowledgements

We would like to thank the following individuals and organizations for their help and support with PRINCE:

- Amanda Simons (IT) and Kimberly Weiderhold (Legal) (Baylor College of Medicine)
- J. Claude Hemphill III, MD (NCS president), Gene Sung, MD (NCS immediate past president), Mauro Oddo, MD (neuro-intensive care section chair ESICM), and Fabio Taccone, MD (deputy neuro-intensive care section chair ESICM)
- Jean Louis Vincent: ICON
- Ian Seppelt: ANZICS
- NCS Research Committee
- ANZICS; ESICM; CCCTG; LABIC; CUHK; IGNITE and MENA (Thanks to Katja Wartenberg)
- ALL participating international sites

The principal investigators for PRINCE were: Jose Suarez, MD, Peter LeRoux, MD, Colleen Bauza, Renee Martin, PhD, Alexandros Georgiadis, MD, Chethan Rao, MD, and Eusebia Calvillo, RN. Jose Suarez, MD is Professor of Neurology and head of the Vascular Neurology and Neurocritical Care Section at Baylor College of Medicine in Houston, Texas. He is a member of the NCS Board of Directors and principal investigator of the PRINCE study. Dr. Suarez is an invited guest writer for Currents.
NCS Releases Guidelines for the Management of Large Hemispheric Infarction

By Michel Torbey, MD, MPH

Large hemispheric infarction is a devastating disease often associated with significant disability and mortality. Family members and physicians are often faced with a paucity of high quality clinical data to help guide clinical care and long term goals of care decisions.

The NCS in collaboration with the German Society for Neuro-Intensive Care and Emergency Medicine (DGNI) organized an international, multidisciplinary consensus conference on the critical care management of large hemispheric infarction to address the need for guidance on management of these patients.

Topics were identified based on clinical decision points in the critical care management of large hemispheric infarction patients. Experts from Germany and North America in the fields of neurosurgery, neurocritical care, neurology, interventional neuroradiology, and neuroanesthesiology were recruited based on their expertise related to each topic. The experts were divided into different subtopic-related panels based on their expertise and clinical practice.

For each clinical question, the panel assessed the quality of the data and developed recommendations using the Grading of Recommendation Assessment, Development, and Evaluation (GRADE) system. The panel graded the quality of the evidence as very high, moderate, low, and very low.

- High = Further research is very unlikely to change our confidence in the estimate of effect.
- Moderate = Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.
- Low = Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.
- Very low = Any estimate of effect is very uncertain.

The GRADE system also classifies recommendations as strong or weak, according to the quality of evidence, the balance between risks and benefits, patient preferences, and cost considerations. One advantage of the GRADE system is that it allows for strong recommendations in the setting of lower quality evidence, as long as there are other mitigating factors.

At the NCS Annual Meeting in October of 2012, each panel member presented a summary of the data and recommendations to the group. The committee met again in Mannheim, Germany on January 23-26, 2013 during the German Society for Neuro-Intensive Care and Emergency Medicine annual meeting.

The committee reviewed key studies and the recommendations made by individual panel members. The final questions were reviewed at the conference and feedback was obtained from a larger auditorium of interdisciplinary neurocritical care practitioners. The final recommendations will be published soon in the Neurocritical Care journal.

Paucity of high quality clinical evidence was the biggest challenge in writing the large hemispheric infarction guidelines. This challenge should be viewed as an opportunity or road map for future research. The highlight of the guidelines is the recommendation to perform decompressive hemicraniectomy within 24-48 hours of symptoms onset and prior to any herniation symptoms in order to achieve the best neurological outcome. This was a strong recommendation with moderate quality of evidence.

Michel Torbey, MD is a neurointensivist at the Ohio State University Wexner Medical Center in Columbus, Ohio. He is the current treasurer of the NCS and chair of the NCS Guideline Subcommittee on Large Hemispheric Infarction. Dr. Torbey is an invited guest writer for Currents.
NCS Announces New Neurocritical Care Research Training Fellowship

By Jose Suarez, MD

The NCS is pleased to announce a research training fellowship for physicians, nurses, pharmacists, and other neurocritical care providers. This program was envisioned due to the high demand for clinical services, struggle for departmental support, and difficulty establishing mentorship relationships for young practitioners that makes the pursuit of research careers difficult.

The direct goal of this program is to foster the development of close mentorship ties, protection of research time, pursuit of research training, and generation of preliminary data necessary to apply for additional scientist development grants training.

This program is, therefore, aimed at promising applicants who are seeking a career in clinical or translational research in neurocritical care and ultimately wish to become independent investigators. Unlike longer training programs, this program is focused on identifying a single year that will allow the time and support to compete effectively for longer training opportunities. It is expected that, at the end of the project, the trainee will be in the process of submitting applications for national, peer-reviewed funding mechanisms to continue the research and research training.

NCS has the stated mission to foster clinical, experimental, and outcomes research focused on developing innovative and cost-effective medical and surgical interventions for acute neurological disorders. Although any research pertaining to acute central nervous system injuries or critical care will be considered, special weight will be given to projects that relate directly to issues important to patients with neurological critical illness.

Eligibility

For the purpose of this fellowship, research is defined as patient-oriented research conducted with human subjects, or translational research specifically designed to develop treatments or enhance diagnosis of neurocritical care illnesses. These areas of research include epidemiologic or behavioral studies, clinical trials, studies of disease mechanisms, the development of new technologies, and health services and outcomes research.

The applicant must be an NCS member in good standing (regardless of nationality or country of residency) interested in an academic career with independent research funding. The award is available for members in all disciplines (physicians, nurses, pharmacists, PhD researchers, etc.) but is meant for early career individuals (within 5 years of completion of terminal degree or training). For physicians, this is best suited to add a supplemental year to fellowship training before entering the first academic position. For other applicants, this award may more likely be used to remove clinical responsibilities for an existing position.

Award

The fellowship will be awarded to one (1) applicant for one (1) post-graduate year. Although applicants in-training may apply, the award year is not to be used during years of training (fellowship, nursing school, pharmacy residency, etc.). $70,000 of support for the applicant including salary and research +10% indirect cost to the institution will be awarded. The award is not intended to cover all the costs for the fellowship year. It is expected that the sponsoring institution contributes time and additional research/salary support. Supplementation of the stipend with other grants or by the sponsoring institution is permissible, but fellows may not accept other fellowships, similar awards, or have another source of support for more than 50 percent of their salary. The stipend cannot be used to support clinical fellowship, graduate school, or residency training. Funding initiation is flexible to begin from January 1, 2016 to July 1, 2016 depending on the applicant’s situation.

The requirements for the fellowship include:

1) An identified mentor who is an established investigator with independent funding
2) Protected research time by the applicant’s department of at least 75%
3) Career training/development program with specific goals
4) Identified research project
5) Clear evidence of institutional support to cover salary gap and research costs

Application Procedure

In order to limit applicant effort, the applicants are asked to submit a two (2) page letter of intent by January 1, 2015.

The letter should include:

1) A description of the applicant’s goals for a research career and their qualifications for beginning training in research
2) A concise description of the project and a strategy for completing the proposed project
3) Identification of a mentor(s) including the mention of the mentor’s qualifications and area of expertise. A description of how the mentor’s expertise will tie into the project should be included if the mentor’s area of research is dissimilar to the project. Mentors can be located at any institution as long as a clear mentorship plan is outlined.
4) A strategy for transitioning this work to a longer training grant opportunity

A letter of support (one page) from the applicant’s department chair expressing support for the terms of fellowship should accompany the applicant’s letter of intent.

Evaluation and Selection

Letters of intent will be reviewed by a Research Task Force to select applicants who will be invited to submit a full proposal.

Deadline and Address

Letters of intent and supporting letter must be received by midnight (CST) January 1, 2015. Notification to prospective applicants to submit a full proposal will be on or before February 1, 2015. Final funding decisions and notifications will be announced at the 2015 NCS Annual Meeting. All letters must be submitted to the NCS at 5841 Cedar Lake Road, Suite 204, Minneapolis, MN 55416.

For questions, contact members of the NCS Research Task Force: Jose Suarez, MD (jisuares@bcm.edu), J. Javier Provencio, MD (proven@ccf.org), Michael Diringer, MD (diringerm@neuro.wustl.edu), Susanne Muehlschlegel, MD, MPH (Susanne@muehlsch.de), or J. Claude Hemphill III, MD (chemphill@sfgh.ucsf.edu).
Meet Becca Stickney, the new NCS Director of Education in the Executive Office. She has only been on the job for three months, but she has already made a major impact on the growth, development, and implementation of NCS educational products and initiatives. Her role is central to the next phase of roll-out of the NCS educational products portal, NCS OnDemand.

NCS OnDemand is a new web portal that is designed to serve as a central repository for NCS-developed educational materials. Over the past few years, we have received numerous requests from NCS member and meeting attendees for slides, videos, and syllabi from the recently concluded NCS Annual Meeting. While the NCS has retained some of these in archives on the society’s computer servers, there has never been an easy way to make them available for re-viewing.

Likewise, there have been numerous requests for syllabus materials from prior board review courses. These have been sold in print and pdf format, but only informally. The realization that the NCS already possessed archives of materials that members wanted but to which they did not have access prompted the society to create NCS OnDemand and to hire an Education Director to spearhead its realization.

OnDemand is available to both NCS members and non-members with the purpose of providing a “one stop shopping” opportunity for existing and future educational offerings from the NCS. Check it out at https://www.pathlms.com/ncs-ondemand. Current offerings include videos and Powerpoint slides from the NCS 12th Annual Meeting in Seattle. Materials from the general sessions are available for free to those who registered for the Annual Meeting and for a fee for those who were unable to attend.

Additionally, OnDemand allows the NCS to provide you with workshop content from the Annual Meeting. One piece of feedback every year is that there is so much good material at the Annual Meeting that no one can take it all in. Well, OnDemand is to the rescue. I am personally looking forward to taking in several workshops that I helped plan, but could not attend due to other NCS administrative responsibilities.

But this is just the start. Look for NCS OnDemand to be an active portal with frequent new offerings including:

- A new place to access ENLS
- The Practice of Neurocritical Care – the NCS practice update textbook will be electronically published by the NCS in early 2015
- The NCS Brain Death Toolkit – a practical set of documents, videos, and protocols that provide definitive information for providers and the lay public on the how’s and why’s of brain death
- Webinars on various topics from NCS committees and interest groups

Also, NCS OnDemand is your portal. Part of the purpose of NCS OnDemand is to demonstrate to NCS members how they might publish and distribute educational products with NCS as the publisher rather going through a for-profit publishing house. The NCS plans to grow its role as a publisher and provide members with a pathway to electronically publish textbooks, pamphlets, and other educational materials.

The newly reorganized NCS Educational Products Committee, chaired by Alejandro Rabinstein, MD and Wade Smith, MD, will be working with Becca Stickney to grow this initiative. While you are at it, head to the Apple iBook store and buy the NCS’s first electronic textbook for the iPad, Emergency Neurological Life Support. This book serves as a companion to the ENLS program and a template for would-be NCS member textbook writers.

So, welcome NCS OnDemand and welcome Becca Stickney. I encourage all of you to get to know both and to get used to the NCS as your educational products provider for yourself, your staff, and those seeking basic and advanced education in neurocritical care.
In the next month, you will be receiving your annual NCS membership renewal for 2015. New this year will be options for early bird discounts and multiple year subscriptions. Membership dues are very important to our society as they help support our Annual Meeting, guideline development, research grants and scholarships, ENLS, workshops and also include your subscription to the *Neurocritical Care* journal. Be sure to renew by 2015 to receive the best renewal rates!

Below is a preview of the updated membership dues for 2015:

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We are happy to report that the Third Neurocritical Care Research Conference: Outcomes Research in Neurocritical Care took place in Houston, Texas on Friday through Sunday, August 15-17, 2014 and it was a great success. The overall goal of this interdisciplinary scientific symposium was to bring together scientists and physicians from diverse fields with a common interest in understanding and advancing the applications of outcomes research in neurocritical care.

The conference was funded by an NINDS R13 grant (1R13NS089282-01, Principal Investigator Jose Suarez) ($25,000), Baylor St. Luke’s Medical Center in Houston ($50,000), and the Integra Foundation ($10,000), and endorsed by the Baylor College of Medicine and the NCS. In addition, the following exhibitors contributed to the success of this event: UCB, Hospira, Stryker, Hummingbird, Ornim Medical, Boehringer-Ingelheim, Bard Medical, Coviden, Medtronic, Genentech, Hemedex, and Moberg Research.

This year, we had 134 attendees from the U.S., Canada, Latin America (Argentina, Brazil, and Peru), the European Union (Germany, Italy, Switzerland, and the UK). Overall, 92% of attendees stated that the conference was excellent and met expectations, 98% thought that the conference was free of commercial bias, and 99% indicated that the conference was fair and balanced.

This symposium consisted of an opening reception followed by four scientific sessions: 1) Special Lectures; 2) Assessment of Outcomes and Interventions; 3) Research Priorities and Outcomes Research in Neurocritical Care; and 4) Research Project Presentation and Discussions. Sessions 1 and 2 took place on the first day of the conference.

The Special Lectures session included discussions on the utility of checklists and outcome calculators, lessons learned from outcomes research in general critical care, and NINDS/NIH funding opportunities. This was followed by interesting lectures and question and answer sessions on evidence-based medicine, comparative effectiveness research, and health technology assessments.

The second day of the conference included presentations on outcomes research priorities in various areas of neurocritical care including traumatic brain injury, subarachnoid hemorrhage, intracerebral hemorrhage, ischemic stroke, status epilepticus, and anoxic brain injury. Lastly but most importantly, several oral and poster presentations submitted by NCS members were discussed.

The oral presentations were as follows:

- Family members’ presence during brain death evaluation: a multicenter randomized study by Mohammed Rehman, DO from Henry Ford Hospital in Detroit, MI
- Randomized clinical trial of the safety and efficacy of pressure reactivity index (PRX) by Christos Lazaridis, MD from Baylor College of Medicine in Houston, TX
- Understanding priorities of surrogate decision makers for intracerebral hemorrhage patients by David Hwang, MD from Yale University in New Haven, CT
- Safety and efficacy of tauroursodeoxycholic acid with or without insulin-like growth factor I for treating moderated blast-induced traumatic brain injury by Afshin Divani, PhD from the University of Minnesota in Minneapolis, MN
- Analyzing cerebrospinal fluid shifts using a novel non-invasive technology – Volumetric Integral Phase Shift Spectroscopy (VIPS) by Chethan Venkatastbba Rao, MD from Baylor College of Medicine in Houston, TX

The outstanding poster presentations were the following:

- Therapeutic hypothermia for refractory status epilepticus by Saifdar Ansari, MD from the University of Utah in Salt Lake City, UT
- A new brain tissue probe for combined monitoring of intracranial pressure, cerebral blood flow, and oxygenation by Emanuela Keller, MD from the University of Zurich in Zurich, Switzerland
- The impact of augmented renal clearance on levetiracetam pharmacokinetics in patients with traumatic brain injury by Kathryn Morbitzer, Pharm D from the Medical University of South Carolina in Charleston, SC
- R.A.P.I.D. (Rivaroxaban, Apixaban, Pradaxa Intracerebral Hemorrhage PharmD) reversal study by Christina Roels, PharmD from Novant Health Forsyth Medical Center in Winston Salem, NC

Attendees at the Third Neurocritical Care Research Conference

Continued on page 10
At the conclusion of the conference, participants were able to: 1) understand the importance and opportunities for outcomes research in neurocritical care diseases; 2) agree that further studies are needed to clarify the role of the assessment of outcomes and interventions that will have an impact on neurocritical care research; and 3) commit to enhance collaborations via the Neurocritical Care Research Network (NCRN) and other NINDS-funded research networks.

All presentations were videotaped and will be presented on the NCS website for general public access very soon. Invited speakers have been asked to submit manuscripts related to their topic for peer review and publication in the Neurocritical Care journal.

The Fourth Neurocritical Care Research Conference is currently being planned and will take place in the Spring of 2016 in Houston, TX. Based on feedback received from prior conferences, we are moving towards disease-specific research symposia and the theme for the upcoming one will be subarachnoid hemorrhage.

This meeting will be arranged in conjunction with the final face-to-face meeting of the Unruptured Cerebral Aneurysms and Subarachnoid Hemorrhage Common Data Element Project. Stay tuned!

Jose Suarez, MD is Professor of Neurology and head of the Vascular Neurology and Neurocritical Care Section at Baylor College of Medicine in Houston, Texas. He is a member of the NCS Board of Directors and principal investigator of the PRINCE study. Dr. Suarez is an invited guest writer for Currents.

Wade Smith, MD and Lori Shutter, MD presenting at the Third Neurocritical Care Research Conference

Other e-books and related materials that will be released on the portal include the Brain Death Tool Kit, developed by the working group led by Dave Greer; the Targeted Temperature Management Monograph developed by Chad Miller; and the ENLS Manual developed by Wade Smith and Scott Weingart. The Pharmacy Committee, Nursing Committee, and Advocacy Committee are preparing other educational materials. It is our hope that these products advance our educational mission but will also generate funds, not only from NCS members but also from members of other societies.

We have also made significant advances in ENLS. Under the leadership of Wade Smith and Chad Miller, the ENLS materials are currently being updated and we are also in the process of launching ENLS to residency directors in Neurology, Emergency Medicine, and Neurosurgery. We have also partnered with SNACC and SCCM to deliver ENLS to their respective memberships. With the leadership of David McDonagh, we have also formally organized a working group that will oversee NCS activities related to fellowship training.

Fiscal Responsibility: Over the last decade, the society has been successful in generating funds but, as our activities have increased, our expenses have also increased. The society has never been short of member enthusiasm and ideas for new and exciting activities. But, we have to start planning these activities not only in relation to our mission but also to ensure fiscal health for the society. The Executive Committee is having a strategic meeting in Phoenix this January to map out the society’s strategy to maintain our fiscal health in order to sustain our activities over the years to come.

There are so many things going on in the NCS that writing about all of them now may occupy a big portion of this issue. So, I will have to hold you in suspense for the next issue. In closing, I invite every member to contact me directly if you have questions or just want to discuss NCS matters. My email is rgeocad1@jhmi.edu.
Emergency Neurological Life Support (ENLS): What to Do in the First Critical Hour of a Neurological Emergency

Saturday, January 17, 2015 • 8:00 am – 3:00 pm
Sheraton Phoenix Downtown Hotel, Phoenix, Arizona

Program Directors
Wade Smith, MD, PhD
University of California- San Francisco
Cherylee Chang, MD
The Queen’s Medical Center

Program Overview
Emergency Neurological Life Support (ENLS) is designed to help healthcare professionals improve patient care and outcomes during the most crucial time - the critical first hours of the patient’s neurological emergency. ENLS covers a collaborative, multi-disciplinary approach that outlines a consistent set of protocols, practical checklists, decision points, and suggested communication to use during patient management.

Completion of this course and online assessment provides 15 hours of Level 1 CME credit and two-year ENLS Certification.

ENLS Offers:
• Advanced knowledge
• Ability to be current on advancements in treatment
• Topics that are directly relevant to neurocritical care
• Improved patient care

The Goals of ENLS Include:
• Improving the care of patients with neurological emergencies
• Providing protocols that list important steps in managing a patient with a potential neurological emergency
• Attempting to standardize emergency neurological care by consensus of healthcare providers
• Providing education to anyone dealing with neurological emergencies
• Identifying areas where research is needed to improve the care of our patients.

Topics
Acute Non-Traumatic Weakness
Acute Stroke
Airway and Ventilation and Sedation
Coma
Intracerebral Hemorrhage
Ischemic Stroke
Meningitis/Encephalitis
Resuscitation following Cardiac Arrest
Spinal Cord Compression
Status Epilepticus
Subarachnoid Hemorrhage
Traumatic Brain Injury
Traumatic Spine Injury

Sub-Topics
Elevated ICP and Herniation
Glasgow Coma Scale (GCS)
Hunt Hess Classification of SAH
World Federation Neurological Scale

REGISTER
www.neurocriticalcare.org/SCCM-ENLS

*This program is held in conjunction with the Society of Critical Care Medicine’s Critical Care Congress. The Society has reviewed the program to ensure its appropriateness for the critical care provider. However, the program is developed and managed by Neurocritical Care Society, an independent nonprofit organization, which is solely responsible for its content and management.*
The NCS has had a presence on social media for quite some time. You can follow our updates on the official NCS Facebook page and Twitter feed @neurocritical. We are increasingly using social media to announce events, promotions, and breaking news. Now, the NCS is venturing into organizing a Twitter journal club.

The concept of a Twitter-based journal club has been around for a few years now and is being used by many societies (e.g., @igsjc, @accintouch, @rcmbjclub, @SocGenMicro). Visibility and accessibility on social media along with outreach makes it a strong platform to conduct a journal club. Anyone with an interest in social media and discussing science can participate and ask questions or indulge in discussions that are of interest not only to the specialists, but also may interest the general public. Since Twitter allows only 140 characters at a time, its lure is in having short and effective discussions.

The NCS is excited to announce that we will be organizing our first Twitter journal club in February 2015. The journal club will coincide with the publication of the latest issue of the Neurocritical Care journal. Editor-in-Chief, Eelco Wijdicks, MD, PhD will select an article of interest from the upcoming issue. The chosen article will be announced through links posted on the NCS website, Facebook, and Twitter with an assigned date and time for the upcoming journal club.

At the assigned time, moderators will be available for an hour to direct discussion on the chosen article. The moderators will post the link to the article and some discussion points and will direct the discussion as needed. The participants may tweet their comments and questions to @neurocritical with the hashtag (#NCSJC).

Our goal is to have at least one of article authors available during discussion to provide their insights on the article as well as interact with the moderators and participants. Every journal club will be archived on the NCS website in the NCS OnDemand portal and will be available for free to review.

**Nuts and Bolts of the #NCSJC**

**Q:** Who can participate?

**A:** Anyone with a Twitter account and access to internet! You can be at home or at work, on a desktop or on your smart phone. Please don’t drive and tweet, though.

**Q:** This Twitter thing is new to me. How does it work?

**A:** You can read our introductory article in the September issue of Currents to get familiar with Twitter. Once you have a Twitter account set up, find the NCS at @neurocritical and follow us.

**Q:** How can I participate?

**A:** Watch out for the time and date of the upcoming journal club through announcements at our Facebook page and Twitter feed, Currents, and emails from the NCS. At the assigned time, log into your Twitter account and follow the moderators instructions. You can tweet your comments to @neurocritical. Use the hashtag #NCSJC. If you are not sure how to best follow the conversation on Twitter, you can use Tweetchat to follow the hashtag.

**Q:** How do I access the article?

**A:** A link to the article will be provided through an easy click in the forthcoming announcement as well as at the beginning of the journal club session.

Hope to see you at the NCS journal club!

Abhay Kumar, MD is a neurointensivist at St. Louis University in St. Louis, Missouri. Aarti Sarwal, MD is medical director of the neurocritical care unit at Wake Forrest School of Medicine in Winston-Salem, North Carolina. They are members of the NCS Communications Committee and invited guest writers for Currents.
Bone Flap Replacement Challenges Dead Donor Rule for Organ Donation

By Edward Collins, MSN, ACNP and Michael Rubin, MD, MA

Neurocritical Care Ethics is a recurring column in Currents that focuses on a case-based approach to medical ethics in neurocritical care. In this column, members of the NCS Ethics Committee discuss the ethical implications of cases submitted by NCS members. To submit a case, please email de-identified information to Fred Rincon, MD, chair of the NCS Ethics Committee, at fred.rincon@jefferson.edu.

Death is traditionally defined as the irreversible cessation of the functioning of an organism. However, the advent of organ transplantation has driven a vigorous debate and redefinition of death. Is it wholly a biological event or a combination of the permanent disruption of the integration of the human body and the cessation of consciousness?

In response to the growing demand for transplantable organs, a 1968 Harvard Medical School committee proposed that a state of irreversible coma with no central nervous system activity constituted "brain death." This eventually led to the 1981 Uniform Determination of Death Act (UDDA) which defined and supported the "whole brain" criteria for death. Legally declaring a person dead based upon these criteria allowed for organ donation to meet the deontological priority of respect for persons. This ethical norm is considered the Dead Donor Rule (DDR).

The DDR has remained the sacrosanct ethical standard guiding organ donation. Although no formal legislation exists, the DDR demands that organ donors be declared dead before procurement begins (with the exception of single kidney and partial liver) and the act of donation must not result in the death of the donor. The DDR's intent is to protect the vulnerable, guarantee respect for human life, and maintain trust in the voluntary system of organ procurement. Please see James Bernat's 2013 New England Journal of Medicine article "Life or death for the dead-donor rule?" for additional information.

However, some believe the DDR impedes organ donation and denies patients the choice of donation in situations where death is imminent. Please see Robert Troug's 2013 New England Journal of Medicine article "The dead-donor rule and the future of organ donation" for more on this perspective. In fact, many have considered broadening the situations under which organ donation is acceptable in an attempt to accommodate patients’ end-of-life decisions and increase the availability of viable organs by allowing donation after cardiac death after withdrawal of support.

Consider the following case submitted by NCS members. A 38-year-old woman presented to an emergency department reporting the "worst headache of her life," quickly decompenated and required intubation. The CT of her brain showed a modified Fisher 4 subarachnoid hemorrhage with intraventricular hemorrhage and hydrocephalus. Her exam was GCS 7T (E2M4V1), pupils fixed and dilated, corneal and gag reflexes intact, and extensor posturing. An EVD was placed and a CTA showed a left anterior communicating artery aneurysm. She underwent right hemi-craniectomy and aneurysm clipping without complication. Post-operatively, she was treated for increased intracranial pressure with maximal medical therapy. She remained in coma without improvement.

During a family meeting, it was decided unanimously to transition to comfort care. The family expressed a strong desire to donate her organs as the patient had a well known desire to be an organ donor. However, the patient did not progress to brain death. Donation after cardiac death was discussed but it was unsure whether the patient would experience a timely progression to asystole. Of specific interest to this review is that the family requested the bone flap be replaced to facilitate brain herniation and brain death, essentially a "terminal cranioplasty." Ultimately the family's request was denied, support was withdrawn and the patient died without donating her organs.

The basis for the denial was that the patient’s death, in this manner, might actually be considered homicide and at least unlawful euthanasia. In addition, it was concluded that reapplication of the bone flap was for the purpose of organ donation which violated the tenets of the DDR.

Now consider the common scenario where a terminally ill patient or a surrogate decides to discontinue curative and supportive therapy including ventilator support to allow for a "natural" death. Is it not the health practitioner who agrees, accommodates, and at times encourages such justifi ed and moral decisions and is it not the practitioner who withdraws the ventilator which ultimately causes death? End of life is "assisted" by physicians every day. As health care providers, we endeavor to honor the oath to do no harm. Equally as important is to respect patient and surrogate autonomy. The greatest respect we may provide them is acceptance and adherence to their decisions. In this case the patient’s and surrogate’s autonomy was not respected by adhering to the DDR.

Both of these deaths result in the same outcome and allow for dignity and control at the end of one’s life, and in the case of donation, beneficence in death. Furthermore, there is public support for this approach. A survey conducted by Nair-Collins at the Florida State University College of Medicine published in the Journal of Medical Ethics in 2014 found that, when presented with a scenario in which organ removal caused the death of a patient in an irreversible coma, 71% stated it should be legal to donate organs in this situation and 67% agreed to donate themselves in the same situation.

The prevailing condition in all decisions is consent and the balance between non-maleficence and beneficence. Thus, it is suggested that with such consent, organ donation before cardiac or brain death declaration upholds the principle of non-maleficence and may be a sound and ethically supported practice that would optimize the wishes of those who wish to donate organs who would otherwise be excluded and maximize organ quality and availability. Relaxing current organ procurement regulations to allow for greater patient autonomy at the end of life does not harm the patient when accepting that death is more than a biological process but utilitarian and deliberate in some circumstances. Allowing a patient to die in a dignified, painless, and peaceful manner dictated by and acceptable to that patient is the ultimate gift one can bestow. Edward Collins, APN (Ed) has almost 20 years of experience in emergency and critical care nursing and advanced practice. Michael Rubin, MD is a neurointensivist and bioethicist from UT Southwestern’s Department of Neurology and Neurotherapeutics as well as Chair of the UT Southwestern Ethics Committee. They are members of the NCS Ethics Committee.
We had a great NCS Annual Meeting in Seattle this past September. It was great to see the participation from NCS members and the willingness to volunteer their time and efforts for the NCS Advocacy Committee. The Advocacy Committee had a chance to meet and address its goals and objectives. The NCS leadership also had a chance to review the work that the NCS Advocacy Committee members accomplished.

One of the accomplishments was to help produce a marketing poster for Emergency Neurologic Life Support (ENLS). This would help increase the awareness about the certification, neurocritical care, and the society. The result is a beautiful brochure that you will see soon thanks to the hard work of many members of the Advocacy Committee under Sarah Livesay’s direction and NCS administrative support from the Executive Office.

Another important project is the development of the NCS speaker’s bureau. The announcement just went through to NCS members to be on the front line of media interactions. As we all are aware, the media seek expert speakers in various topics to give a brief view and expert opinion on health issues that make national and regional news.

Media channels often reach out to professional societies requesting an expert opinion. Most of the time, it is hard to do that because of time constraints and the need for rapid availability. The NCS Advocacy Committee worked to create a process through which a speaker’s bureau is created from volunteer NCS experts to represent the society for these media engagements and commentaries.

In addition, the NCS is looking to expand a popular feature of the NCS website called Stories of Hope. Many patients in the Neuro ICU have suffered serious brain injury and may be comatose or minimally responsive. This can be a very frightening time for both patients and family members. While, for some patients, neurologic injury may be permanent or devastating, these stories of hope are designed to provide information from the perspective of the medical community (physicians, nurses and nurse practitioners) and also from patients and family members. These stories would help support and promote the NCS and match its advocacy mission.

The Advocacy Committee updated a toolkit of neurocritical care fact sheets and patient handouts. These documents will build from the NCS website resources developed by the Communications Committee. The documents will be easily accessible and easily printable by the general community seeking information about the field of neurocritical care, and easily printable by the neurocritical care team caring for patients at the bedside. You should see these updates soon on the NCS website.

The Advocacy Committee is working currently with the leadership to identify its projects for the coming year. With that in mind, the committee updated its membership with enthusiastic NCS member volunteers to add new blood to its ranks and help carry the mission forwards. At the same time, we had to thank some of the members of the committee for their efforts to allow for a smaller more efficient committee. The Advocacy Committee thanks all past members for their work and we are looking forward to new members to add more to its success stories.

We thank all our members for their continued support and advocacy efforts to promote NCS and the care of patients with critical neurological conditions. Please do not hesitate to reach out to the committee if you have any additional thoughts or suggestions for NCS advocacy.

Tamer Abdelhak, MD is the Director of Neurocritical Care and Associate Professor of Neurology at Southern Illinois University School of Medicine in Springfield, IL. Sarah Livesay, DNP is a neurocritical care advanced practice nurse at Rush University Medical Center in Chicago, IL. They are co-chairs of the NCS Advocacy Committee.
American Heart Association Announces New Cardiac Arrest Research Funding Initiative

By Robert Kowalski, MD

Hoping to spur ongoing and new research into neurologic protection and improved outcomes in survivors of cardiac arrest, the American Heart Association (AHA) has launched a new initiative with dedicated funding for cardiac arrest resuscitation studies and trials.

Grant applications opened on November 15 for funding opportunities in the three new cardiac arrest research classifications: basic science, clinical science, and population/health services science.

"Survival with good neurologic function is the ultimate goal of cardiac arrest resuscitation," said Robert W. Neumar, MD, PhD, Chairman of the AHA’s Emergency Cardiovascular Care Committee. "The creation of cardiac arrest science classifications will enhance the review of grant applications focused on brain injury caused by cardiac arrest. Previously, these applications were reviewed in a study section primary focused on stroke research."

Applications for funding in the new classifications are due by January 13 or January 15, 2015, depending on the regional affiliate. Subsequent deadlines will follow the AHA biannual schedule: http://my.americanheart.org/professional/Research/FundingOpportunities/Affiliate-List-by-States_UCM_320497_Article.jsp

One overarching goal in cardiac arrest and resuscitation research is improved assessment of neurologic function, said Dr. Neumar, who is Chairman of Emergency Medicine at the University of Michigan.

"In my opinion, the greatest need is to develop a mechanism to continuously monitor ongoing brain injury and response to therapy," Dr. Neumar said. "This will enable goal-directed brain resuscitation, which is essential to optimizing outcomes in comatose post-cardiac arrest patients."

Many questions are as-yet unresolved in the decade-long effort to employ hypothermia therapy for neuroprotection in cardiac arrest survivors. "What remains unclear is the optimal onset, target temperature, and duration of therapy," said Dr. Neumar.

"In addition, the concept that there is one target temperature and duration that is ideal for all patients is fundamentally flawed. I believe we will eventually discover the optimal dose of hypothermia varies depending on severity of injury and response to therapy," he said. Among acute cardiac arrest therapies showing promise is extracorporeal cardiopulmonary resuscitation, Dr. Neumar said.

"A growing number of case series have shown promising results with the use of Extracorporeal Cardiopulmonary Resuscitation (ECPR) for refractory out-of-hospital cardiac arrest. Although resource intensive and technically challenging, eventual widespread implementation of this technique could have a dramatic impact on overall outcome."

Along with animal models of ECPR, research topics considered basic science in the new AHA funding classifications include pre-clinical studies in asystole, physiologic monitoring during CPR, mechanisms of post-cardiac arrest brain injury and repair, and airway management and ventilation during CPR.

The clinical science classification includes human studies in CPR (quality, pharmacology, bystander, and dispatch assisted), IV and intraosseus access during CPR, and genetic risks of cardiac arrest.

The population science classification includes such topics as public access to automated external defibrillators, systems of care after cardiac arrest (in-hospital and out-of-hospital), and resuscitation training.

Details of the new classifications and grant funding opportunities may be found here: http://www.heart.org/HEARTORG/General/Resuscitation-Grant-Classifications_UCM_469213_SubHomePage.jsp

"In order to have dedicated study sections for the new cardiac arrest/resuscitation major science classification, a minimum of 20 applications are required for each major category. So submit now for this initial cycle and submit often after that," Dr. Neumar said.

Robert W. Neumar, MD
Research during Neurocritical Care Fellowship: Challenges and Opportunities

By Saef Izzy, MD

In the old days, being a good physician was determined solely by providing good clinical care to patients. Research was limited to a few academic institutions and training in clinical research was not a requisite in the make of a good doctor.

In the modern era, research has been evolving on a daily basis and evidence-based medicine is now heavily relied upon. One could not assume comprehensive training without being acquainted with methods of research whether by active participation in ongoing trials or taking the extra step of starting a self-initiated project.

One of the most daunting tasks for trainees is to find dedicated research time. From personal experience as someone who was involved in research projects since the early days of my residency, I can say that it all falls down to good time management, colleague and leadership support, and passion for answering an exciting, feasible question. These are all keys of success for any project.

Do not be frustrated. It is clearly a time consuming, lengthy process, which requires a clear set of research project targets that are practical and reachable. It should be understood that difficulties are expected to rise not only at the beginning but also throughout the whole process. One should be mindful of possible setbacks and delays and that is why setting deadlines should be discussed among all parties involved. Planning for regular meetings to update the research team and to ascertain that all members are on the same page is a vital strategy.

As neurocritical care fellows, we are all different in our backgrounds and skills. For those who have not had a chance to do research prior to or during residency, it actually does not constitute a deterrent factor, in itself. The key is to define certain questions that interest and puzzle you, and that is always a good place to start. Good mentorship is another major key of a successful project. Be mindful that a good research mentor is someone who can tailor a project to the level of the trainee. Choose a mentor who has the time to meet with you and is also able to build a research team that acts as a unit.

The NCS is a great example of a research-encouraging environment, which aims to support clinical, experimental, and outcomes research for acute neurological disorders. To emphasize this statement, the NCS organized for the first time a research career development session during the 2014 NCS Annual Meeting in Seattle. The session was chaired by Jonathan Rosand, MD, MSc from Massachusetts General Hospital and Kevin Sheth, MD from Yale University Hospital.

Many fellows nationwide, however, did not get a chance to attend this session, which was held the day prior to the Annual Meeting official start. To have more information about this event, I interviewed Dr. Rosand to tell us more about the session goals and objectives.

Dr. Rosand acknowledged the opportunity for fellows at the beginning of their research career to participate in NCS research sessions. During the last session, Dr. Rosand and his colleagues reviewed participants’ project drafts and IRB proposals and gave participants live constructive feedback about the strengths and weaknesses of their work. Participants were also asked to provide names for possible future mentors and received feedback about potential mentors. Attendees were also introduced to accomplished clinical and basic science researchers to talk about their ideas and learn about possible project funding resources.

Another future view suggested by Dr. Rosand is to organize another session next year in which fellows are strongly encouraged to participate. The long term promising future plan is to start a network of mentors and mentees within the NCS where fellows will be matched depending on their research interest with an appropriate mentor.

The aspiration of securing dedicated research time is not farfetched anymore. The NCS has taken the initiative this year to start a neurocritical research training fellowship as a reflection of the challenges that have been facing fellows due to heavy clinical training demands. The aim of this program is to provide one year of secured research time, which is a great opportunity for us to generate preliminary data necessary to apply for additional career development training grants down the road.

If you are interested, please visit the NCS website and find out more information about the fellowship in the Science and Research section. Letters of intent and supporting letters must be received by midnight (CST) on January 1, 2015.

Our next step is to survey fellows nationwide to learn more about their research areas of interest and preparedness of fellowship programs to provide appropriate research time and mentorship. Your participation in the survey will be very helpful for the NCS to better structure our fellowship curriculum and possibly open more doors for fellows to be more actively involved in research.

Always remember, neurocritical care is an evolving field that faces unprecedented demands for a novel approach to treating heterogeneous and incompletely understood acute brain pathologies. To meet these demands, engaging in research is the challenge of our generation.
This past year was challenging but rewarding as the NCS underwent restructuring to better achieve the purposes and goals of the society. The NCS is quickly growing and there are currently 77 NCS members who are pharmacists.

NCS Annual Meeting
Forty-two pharmacy members attended this past year’s NCS Annual Meeting in Seattle. Many pharmacy members contributed to the overall success of the meeting. Shaun Rowe and Eljim Tesoro did a fantastic job serving on the Annual Meeting Planning Committee. Shaun Rowe gave the Neuropharmacology Update as part of the Practice Update session. Theresa Human coordinated another Neuropharmacotherapy Workshop that showcased many great speakers including Jennifer Bushwitz, Amber Castle, Chad Miller, Raj Dhar, and Chris Morrison. Two of our members, Sherry Tokumaru and Kathy Morbitzer, received the Integra Travel Award to attend the Annual Meeting.

This year, the pharmacy group engaged in not only stimulating conversation about the newest trends in pharmacotherapy, but also enjoyed a fun “speed-dating” style networking event at the Pharmacy Cocktail Hour. Each member spent two minutes conversing with other pharmacy members until all had officially met!

Fellow of the Neurocritical Care Society (FNCS) and Presidential Citations
The Fellow of the Neurocritical Care Society (FNCS) designation recognizes those with exceptional service, academic excellence, and leadership in neurocritical care. Two pharmacy members who earned recognition as FNCS this year were John J. Lewin III and Gretchen Brophy. In addition, the NCS Presidential Citation, an award that recognizes members of the society who have put forth extraordinary effort, was awarded to Aaron Cook, Amber Castle, and Theresa Human.

Pharmacy Members in the Society
It was with great excitement that we learned that Gretchen Brophy was appointed as Secretary of the NCS at the Annual Meeting. We know she will do an amazing job leading the organization in her new role and we are very proud to have a pharmacist as an NCS officer.

We would also like to welcome the new Pharmacy Leadership Committee. This committee is made up of pharmacists that serve on various NCS committees and are leaders in the society. The chair of this committee is Theresa Human with Amber Castle serving as co-chair. The new members include Kathy Baldwin, Jennifer Bushwitz, Kathleen Chester, Aaron Cook, Olabisi Falana, Haley Gibbs, Kimberly Levasseur-Franklin, Chris Morrison, Nicholas Panos, Denise Rhoney, Shawn Rowe, and Eljim Tesoro.

Guideline Development
The NCS is committed to the development of clinical management guidelines that are appropriate for neurocritical care practitioners. The International Multimodal Monitoring Consensus Guidelines and the Large Hemispheric Infarction Guidelines were presented at the 2014 NCS Annual Meeting. In addition to facilitating the development of all the guidelines as co-chair of the NCS Guidelines Committee, Gretchen Brophy also assisted on the Multimodal Monitoring Guidelines. Denise Rhoney also contributed to the Large Hemispheric Infarction Guidelines.

Upcoming guidelines in varying stages of development with pharmacy section members leading or assisting in their development include: Acute Resuscitation in Devastating Neurological Injury (Kiranpal Sangha), Coagulopathy Reversal (John J. Lewin III and Aaron Cook), DVT Prophylaxis (Keri Kim and Xi Liu), and External Ventricular Drainage (Shaun Rowe).

Publications
Lead by Shaun Rowe and Haley Gibbs, the Pharmacy Section successfully published a comprehensive review of seizure prophylaxis in neurocritical care patients. The article is full of useful information and can be found in Pharmacotherapy 2014;34(4):396-409.

Neurocritical Care Pharmacology Webinars
The Pharmacy Leadership Committee, in conjunction with the Nursing Committee, is planning to offer a series of upcoming neurocritical care webinars. The series – titled PONS (Pharmacotherapy Of Neurocritical care Series) – will be an enduring, web-based program designed to provide neuropharmacotherapy education to all disciplines. We hope this will be the inaugural year to launch this educational tool. CME opportunities will also be offered.

On behalf of the Pharmacy Leadership Committee of the NCS, thank you for all you do to make the society successful!

Theresa Human, PharmD is a neurocritical care pharmacist at Washington University in St. Louis, Missouri and chair of the NCS Pharmacy Leadership Committee.

The NCS Pharmacy Committee at the Annual Meeting in September
There are many opportunities for the neurocritical care nurse to care for a patient in their first hour of a neurological emergency. The NCS has created a comprehensive educational program called Emergency Neurological Life Support (ENLS) to outline the key steps to manage these patients within the first hour of a neurological emergency. On-line training and certification in ENLS is now available for all neurocritical care nurses on the NCS website.

The first few hours of a neurological emergency is the most critical time for essential patient outcomes. Adequate preparation for these emergencies needs to be available for the neurocritical care nurse. The ENLS course, an on-line course for learning at your own pace, can help the neurocritical care nurse advance his or her knowledge and improve patient care.

Access to this course is available 24 hours a day and you can return to the program anytime during and after certification completion for two years. ENLS certification is approved for continuing education credits and will allow the neurocritical care nurse to be up-to-date on the innovations in neurocritical care treatment. This certification is good for two years.

The ENLS protocols help to standardize the important early steps to provide patients the best outcomes from neurological injuries. ENLS includes outlines, checklists, and decision points to use during this multidisciplinary approach to early critical patient management. These protocols suggest specific communication between healthcare providers to ensure that the essential elements necessary for patient care are communicated. ENLS allows neurocritical care nurses to expedite care for neurological emergencies based on these protocols.

The ENLS course includes the following topics: acute non-traumatic weakness, acute stroke, airway management and ventilation, sedation, coma, intracerebral hemorrhage, ischemic stroke, meningitis and encephalitis, resuscitation following cardiac arrest, spinal cord compression, status epilepticus, subarachnoid hemorrhage, traumatic brain injury, and spinal cord injury.

There are a few sub-topics, such as: elevated intracranial pressure and herniation, Glasgow Coma Scale, Hunt and Hess classification of subarachnoid hemorrhage, and World Federation Neurologic Surgeons classification of subarachnoid hemorrhage.

The ENLS certification course provides the core issues that should be attended to within the first hours of the patient encounter. Key elements are offered to ensure proper communication among the healthcare providers when a neurological emergency is occurring. Neurocritical care nurses can quickly focus on the most important considerations by using the checklists included in the ENLS course.

Neurocritical care nurses also have the opportunity to become an ENLS trainer through the NCS train-the-trainer program for ENLS courses. The requirements include: ENLS certification, successful completion of an ENLS train-the-trainer course, and signing a confidentiality agreement. The ENLS train-the-trainer course can be found on-line the NCS website at www.neurocriticalcare.org or in-person at the NCS Annual Meetings for $125.00. This is a great opportunity to teach other critical care and emergency nurses important protocols to care for a patient in the first hour of a neurological emergency.

The first few hours of a neurological emergency needs the expertise of a well-trained neurocritical care nurse. ENLS certification can offer protocols to provide patients better outcomes from a neurological injury. Neurocritical care nurses certified in ENLS can provide these patients the best possible care in the first few hours of a neurological emergency.

Cynthia Bautista, PhD, RN, CNRN, SCRN, CCNS, ACNS-BC, FNCS is a Neuroscience Clinical Nurse Specialist at the Yale-New Haven Hospital in New Haven, CT. She is a member of the NCS Nursing Committee and an invited guest writer for Currents.
Neurocritical Care Practice in Middle-Income Countries: the Brazilian Paradox

By Gisele Sampaio Silva, MD, MPH, PhD, Antonio Luis EirasFalcão, MD, MSc, PhD, Pedro Kurtz, MD, and Maramelia Miranda Alves, MD, MSc

Brazil is a continental and multiethnic country with a population of almost 200 million people. Recently, the institution of major social programs has shifted 50% of the Brazilian population above the extreme poverty line. However, Brazil is still a country of great social inequalities and this holds true when we evaluate the data for the availability of critical care from different regions of the country.

Neurocritical care is a relatively new specialty and its implementation is fortunately growing speedily in Brazil, just as it is around the world.

As in other middle-income countries, neurocritical care follows the social disparities that divide Brazil into two different realities. The upper and middle classes, that can afford good private health care insurance, receive high-quality neurological care in general intensive care units and dedicated Neuro ICUs. In contrast, the majority of the population has limited access to advanced care for acute neurological injuries.

In 2009, Brazil had a total of 25,367 ICU beds distributed around the country. Of those, 39% were in private hospitals, 33% in philanthropic hospitals, and 25 % in public institutions. Two percent of the units were not classified. Interestingly, in this census, 1,516 ICU beds in Brazil were dedicated coronary care beds, while no beds were registered as dedicated neurological care beds.

This is striking since stroke is the leading cause of death in our country. More than half (53.8%) of the hospitals with critical care units in the country were located in the wealthiest southern and southeastern regions. In 2008, the mean ratio of ICU beds per 10,000 inhabitants was 1.3 in Brazil, ranging from 1.7 in the southeast region to 0.7 in the northern region of the country.

Fortunately, stroke care has evolved considerably in Brazil. The National Stroke Project is a task force of stroke neurologists developed by the Brazilian Stroke Network that has the objective of providing scientific support to the establishment of a nationwide network to improve education, care, and research for the patient population with stroke in the country. The program led to the development of stroke centers inside secondary and tertiary hospitals across the country and the number of stroke units in the country has increased considerably as well as the interest of neurologists in acute neurological disorders.

Two stroke centers in São Paulo are accredited by the Joint Commission International as primary Stroke Centers (Hospital Israelita Albert Einstein and Hospital Paulistano) and two centers in Rio de Janeiro (Hospital Pro-Cardíaco and Hospital Quinta D’or) have received certification by the Canadian Stroke Network.

Training in neurocritical care has also expanded considerably. The creation of the Neurological Intensive Care Medicine Committee (CoMIN) inside AMIB (Brazilian Intensive Care Medicine Association) had the goals of gathering neurointensivists from different backgrounds, defining training and certification programs in neurocritical care, and developing collaborations in clinical research. The success of this chapter in AMIB is confirmed by its two-day course that trains around 800 professionals annually with a full intensive program in neurocritical care: the CITIN course (“Curso de Terapia Intensiva Neurologica”).

Some longer term educational programs are also well established including a year-long theoretical program in neurocritical care that includes practical sessions at Hospital Sírio Libanes and Hospital Albert Einstein in São Paulo, and Instituto Estadual do Cérebro Paulo Niemeyer in Rio de Janeiro.

Moreover, the implementation of dedicated neurocritical care units has advanced in the public and private sectors in Brazil. Different and innovative models are used with some units run primarily by intensivists with active participation of neurologists and some units run by neurologists. In these units, the practice of multimodal neuromonitoring, including continuous EEG, brain tissue oximetry, and microdialysis has advanced and has become a reality.

Despite the recent progress, there is a lot of work to do. We need to improve neurocritical care training in neurology, neurosurgery, anesthesiology, and intensive care residency programs. We also need to stimulate the creation of dedicated Neuro ICUs in large academic and public hospitals around the country. Finally, collaborative work that includes neurologists, intensivists, and neurosurgeons is crucial for the development of the neurocritical care field in the country.

In conclusion, the history of neurocritical care in Brazil is a good example of how determination and creativity can be used to implement a new and challenging specialty in a developing country. We still have a long road to achieve the universality and equality that form the theoretical constitutional principles of our public health care system. Interventions with focus on training, certification, and implementation of evidence-based medicine are needed. These should be established and planned according to each country’s regional realities and available resources.

Here we are back to the country with the largest international representation of the NCS, Brazil. Four active members of the NCS, led by Gisele Sampaio, present the intriguing situation of delivering neurocritical care in their country, a constantly growing nation.

-Katja Wartenberg, MD, section editor
As the 2014 NCS secretary, I am excited to write my first article to bring you up to speed on what is going on in the NCS. However, before I do this, I would like to say that I am honored and excited to be representing the NCS membership as the first pharmacist executive officer! Thank you for the opportunity!

Throughout my year as secretary, and on my way up the ladder to president, I hope to continue to enhance collaborations amongst our multidisciplinary members and keep you informed of what’s happening in the NCS on both a professional and personal level.

I hope many of you were able to attend our 12th Annual Meeting in Seattle in September. It was a great success with many firsts. This was the first year that a pre-meeting day was offered that focused on topics of high importance to early-career members and included the Practice Update, mentorships, and workshops. It was also the first year for e-posters which allowed for small group research presentations and discussions.

In addition to the excellent symposia and workshops, we were also able to get out and enjoy the beautiful Seattle weather with a fun run and walk. Getting up at 6 AM to run is usually not something some of us would call fun, but many of our dedicated members got out of bed and enjoyed the adrenaline rush! Finally, we had our first opportunity to sing with the band at the closing banquet at Experience Music Project Museum, which was an experience for all and was a great fundraiser for the NCS Research Training Fellowship.

The NCS membership continues to grow with currently over 1,300 members in 52 countries. It should be applauded that we are a very diverse group with many health care disciplines actively contributing to the mission of the society. Dual membership with other societies is also on the radar to encourage new members to join the NCS as well as enhance collaboration with other societies.

Over the next year, our goal is to grow the NCS by 10%, so please contribute to the cause by encouraging your colleagues, fellows, residents, nurses, nurse practitioners, pharmacists, physician assistants, and other health care professionals to join!

In January, please be on the lookout for the call for applications for the Fellow of the Neurocritical Care Society (FNCS) and be sure to nominate yourself or others who would be qualified for this prestigious recognition. In addition, the Get Involved with NCS campaign will be launched and I encourage all of you to volunteer for committees and projects so we can continue to move our society forward.

Last, but not least, I would like to highlight some news from our members. Dr. Jennifer Frontera from Cleveland Clinic has a new bundle of joy, Bridget Marion Hickey, who was born on October 7, 2014 weighing 7 lbs 5 oz. Congratulations Jen!

Dr. Stephan Mayer was appointed as Director of the Institute for Critical Care at the Icahn School of Medicine at Mount Sinai. In this new role, he is responsible for overseeing the clinical, educational, and research operations of the adult critical care environment throughout the Mount Sinai Health System in New York City.

Dr. Jan Claassen should be congratulated as he was appointed as the Medical Director of the Neurocritical Care Unit at Columbia University Medical Center. In addition to all of his hard work on the Guideline Committee, he is really going to be busy!

Finally, Sarah Livesay, DNP, has taken a new position in Chicago at Rush University Medical Center, where the weather is a little different than Houston… Good luck Sarah!

As 2014 winds down, it looks like winter is coming in like a lion, so watch out. It’s going to be a cold one! Just remember, our 13th Annual Meeting is just around the corner in sunny Scottsdale, Arizona to warm you up! I wish you all a very happy holiday season and hope you take a break from the hustle and bustle of the Neuro ICU to enjoy your family and friends.
I would like to point out several papers on brain death determination to the readers of the Neurocritical Care journal. Although brain death determination is done infrequently (and possibly declining), it is the unique expertise of the neurointensivist that is often called upon for brain death testing. For many of us, there are practical issues and concerns and new data continue to emerge.

First, I would like to point out one of the first publications on simulation-based training in brain death determination. David Greer’s group report on 38 participants in didactic sessions. This paper by MacDougall and colleagues found that baseline knowledge of brain death determination was low but improved substantially after a course. The study also showed that the level of training played a role and the neurology and neurosurgery residents scored lower than attending physicians. This is remarkable because many hospitals may ask neurology and neurosurgery residents to perform neurologic examination for brain death testing, at least initially. The brain death simulation used here has an interesting scenario that should be useful for practitioners who are involved in simulation centers.

Also in this issue of the journal, our group at the Mayo Clinic reports that the apnea test, using adequate precautions, is very safe. The number of complications with apnea testing continues to decline with hypotension in less than 20% of patients and even then it was easily managed with an increase of vasopressor infusion.

This journal issue also publishes a web-based questionnaire about brain death determination sent to representatives of 33 European countries. It is authored by Giuseppe Citerio and colleagues from the Neurointensive Care Unit in Monza, Italy and co-authored by Martin Smith from the Department of Neurocritical Care at the National Hospital of Neurology and Neurosurgery. Considerable variability was shown in clinical examination and confirmatory tests, with conventional angiography the preferred method followed by transcranial Doppler ultrasound, CT angiography and CT perfusion, and MR angiography. Electroencephalography seems to be on the downward slope. The authors conclude that the reliance on confirmatory tests in Europe should prompt a review and development of international consensus.
Combination of Secretoneurin and NSE may be Useful Biomarker for Hypoxic Encephalopathy after Cardiac Arrest


Secretoneurin (SN) is a 33-amino acid neuropeptide that is specifically expressed in endocrine, neuroendocrine and neuronal tissue, with a widespread distribution in the brain. In the normal state, SN is only present in extremely low concentration in peripheral blood (<9 femtomol [fmol]/ml), but it is upregulated by hypoxia.

The aim of this prospective, observational study was to evaluate the role of SN as a new biomarker for severity of hypoxic brain injury in cardiac arrest patients admitted after successful CPR. A prospective power calculation was performed, with a total estimated sample size of 150. Between 9/2008 and 4/2013, 152 consecutive patients admitted to a single European center were enrolled; 18 patients were excluded due to loss to follow-up or death due to non-neurological causes, leaving 134 subjects for analysis. Peripheral blood samples were drawn for daily determination of SN and neuron-specific enolase (NSE) starting on the day of CPR for up to 7 days. Mild therapeutic hypothermia (MTH) was routinely applied to a goal temperature of 33°C for 24 hours according to published guidelines. Neurological assessments were performed by a neurointensivist after weaning off sedation, as well as at discharge from the ICU and hospital.

Neuroimaging, bilateral median nerve SSEP and non-continuous EEG were prospectively collected. The primary outcome was the Cerebral Performance Categories (CPC) immediately before hospital discharge or a long-term care facility. Decisions about withdrawal, withholding, or limitation of life-sustaining treatment or maximal therapy were discussed in a medical consensus conference with the treating intensivists and neurologists, and were based on clinical, neurophysiological, and imaging data with a standardized approach, while considering the patient’s underlying diseases.

NSE levels, but not SN levels, were available for prognostication. After a consensus recommendation was derived, it was discussed with the patient’s family. The median age of the study population was 64 years (range 53-75), with 68% having received bystander CPR. The initial rhythm was ventricular fibrillation in 57%, asystole in 23%, ventricular tachycardia in 1%, and PEA in 13%. In 4%, the initial rhythm was not available.

Poor outcome was observed in 51%, of which 17% received maximal therapy, and the remainder received withdrawal or withholding of therapy. In 45%, hemolysis interfered with NSE measurements in at least one sample. A peak of SN was observed in all patients within the first 24 hours to a mean 54 (range 28-87) fmol/ml, with SN levels decreasing to almost normal levels after that. In contrast, NSE levels peaked after 48 hours. Because the kinetics of both biomarkers showed that the first 72 hours was the most significant period, all further analyses were restricted to this time period.

Univariate analyses showed that patients with poor outcome had significantly higher SN and NSE levels within the first 24 hours and 24-48 hours, as well as 0-48 hours (for SN) and 0-72 hours (for NSE, based on kinetics) after CPR. ROC area under the curve for SN determined in the first 48 hours was 0.75 (0.66-0.84; sensitivity 38%, specificity 95%) and for NSE in the first 72 hours was 0.88 (0.82-0.95; sensitivity 80%, specificity 81%). The kinetics of SN was not influenced by MTH or hemolysis.

In combination, the two biomarkers achieved an ROC area under the curve of 0.93 (0.88-0.97) for predicting poor outcome. By adding SN to NSE, there was a significant improvement in the C-statistic (p=0.03) and improvement of predictability of poor neurological outcome (p=0.001). Both SN within 48 hours and NSE within 72 hours were significantly associated with poor outcome even after adjusting for age, initial rhythm, time to ROSC, bystander CPR, and MTH and lactate levels in first 24 hours.

This is the first prospective human study evaluating SN as a biomarker for hypoxic brain injury after cardiac arrest. Compared to NSE, SN had a lower sensitivity, but higher specificity. Advantages of SN include that it is not influenced by MTH or hemolysis, which was common in this study and influences NSE. The authors were able to show a striking improvement in the outcome prediction model when combining both SN and NSE.

They appear to have put in place a standardized, multidisciplinary consensus approach to recommending withdrawing or withholding therapies, but do not clearly state whether this was truly done in a protocolized fashion at pre-determined time points. Limitations of this study include lower-than-planned power, non-standardized time periods for neurological examinations, upon which determinations were made to withhold or withdraw therapies.

Also, outcome was assessed either at discharge from the hospital or a long term care facility, and not at a standardized time point after cardiac arrest. Validation should be performed in other centers. Nonetheless, the combination of SN and NSE provides hope for the discovery of a biomarker set for outcome prediction after cardiac arrest.

Aggressive Targeted Temperature Management Lacks Favorable Impact on Short Term ICH Outcomes


This single center, retrospective, historically controlled, case-control study sought to determine the impact of aggressive Targeted Temperature Management (TTM) upon short term spontaneous intracerebral hemorrhage (ICH) outcomes. Patients were eligible for study consideration if they suffered ICH and exhibited two consecutive hourly bladder temps >38.3°C despite treatment with acetaminophen and a surface cooling blanket and were subsequently treated with TTM. Patients were excluded if death or withdrawal of therapy occurred within 72 hours.

Continued on page 23
Patients undergoing TTM were treated with a surface cooling device (Arctic Sun, Medivance Inc., Louisville, KY) targeting a core temperature of 37°C for a duration determined at the discretion of the treating physicians. Over a four-year period at Columbia University Medical Center (2006-2010), 40 patients met criteria. This cohort was historically matched by ICH Score to 40 patients at the same center from 2001-2004, prior to aggressive TTM implementation.

Aggressive TTM began on post-hemorrhage day 2.5 (mean) (IQR 1-4.5) for a median duration of 6 days (IQR 3-9). Both groups had comparable demographics, pre-hospital medications, past medical histories, and ICH Scores. GCS trended lower (TTM 6 vs. control 8, p=0.08), ICH volumes were larger (39 cc vs. 29 cc, p=0.2), and intraventricular hemorrhage was more common (88% vs. 78%, p=0.2) in the TTM group.

Medical treatments and complications, such as intubation (40% vs. 35%, p=0.03), percent days with sedation (71% vs. 10%, p<0.001), days on mechanical ventilation (14 vs. 6, p=0.003), and occurrence of peak glucose >180 mg/dl (37% vs. 24%, p=0.001) were more common in the TTM group. Rates of poor outcome (mRS 4 or 5) at hospital discharge were 65% for each group. Mean daily maximum temperature was higher in the control group over the first 12 days (38.7°C vs. 38.1°C, p < 0.001).

This study failed to show a short term benefit of aggressive TTM in a small cohort of ICH patients. While this study is novel in its evaluation of the often assumed benefits of targeted normothermia, there are some methodological concerns which warrant consideration. Descriptions of the temperature control data are sparse in the manuscript. The abstract provides mean daily maximum temperature results and a manuscript figure graphically displays median core temperatures without statistical analysis. Neither of these were discussed in the results.

The modest differences between daily maximum temperatures do not speak to the degree of total fever burden and do not discount the possibility that TTM was ineffective in achieving the normothermia goal. The trend in larger hematoma volumes and poorer baseline GCS may have impacted the ability to observe a treatment benefit.

Additionally, it is not clear if poor mRS at time of discharge is an adequate clinical endpoint, particularly for a study of this size. The increased rate of medical complications was alarming in this study. Bedside shivering assessments were performed in only a portion of patients and it would be interesting to see if monitoring and management of patient cooling and effectiveness of TTM therapy have improved at this center as they have acquired more TTM experience.

This privately maintained website is a free compilation of teaching, quizzes, and simulators on a multitude of trauma-related topics. The owner of the website is a trauma EMT who claims to be a “trauma junkie.” Click on the “Skills and Testing” link on the left side of the webpage to get to a potpourri of rather “wild” links that are fun to search through.

While some lead to interesting, usually fairly hidden academic websites, such as the “acid/base online tutorial” at the University of Connecticut, others lead to simulators (e.g., ACLS Skills Simulator), an ECG library, cardiac trivia, and several other helpful resources.

While one link only led to an app in the AppStore, most were functional, and even included a geeky Powerpoint template to create your own “medical jeopardy” game. My particular interest was sparked when I saw the “Neuro Trauma Sim” tab. It leads to a simple website with a case scenario with multiple-choice answers. I have to admit that this particular simulator was a bit irreverent, though it made me smile. It took a few tries to get through, and I’m still not quite sure of the true meaning of the color-coded “Neuro-o-Vision” brain on the right side of the page.

Try it out for yourselves.
http://www.traumamedic.com/
The University of Rochester Medical Center (URMC) is located in Rochester, New York and provides high quality healthcare to the western New York region. The medical center's primary hospital, Strong Memorial Hospital, is an 830-bed academic facility with 67 critical care beds.

It is one of only three hospitals in the state of New York that has been certified by the Joint Commission and American Heart Association/American Stroke Association as a Comprehensive Stroke Center. Pivotal to this certification has been the recent establishment of the NeuroMedicine Intensive Care Unit (NMICU) under the leadership of Manjunath Markandaya, MD, MBBS.

The NeuroMedicine ICU at URMC was founded upon the vision of Webster Pilcher, MD, PhD (Chair of Neurosurgery), Robert Holloway, MD, MPH (Chair of Neurology), and Michael Apostolakos, MD (Director of Adult Critical Care). The URMC Neurosurgical and Neurology programs were already nationally recognized. However, they recognized that opening an ICU dedicated to critically ill patients with neurosurgical and neurologic diseases was necessary to deliver the best possible care to patients and their families.

After long and meticulous preparation, the ICU opened its doors on October 14, 2013 and moved to a newly renovated, state-of-the-art facility on July 29, 2014. Since its opening, the NeuroMedicine team has provided multidisciplinary care to critically ill patients with complex neurosurgical and neurological life threatening illnesses, as well as patients in shock states and/or with multi-organ failure.

Dr. Markandaya was recruited from the R. Adams Cowley Shock Trauma Center at the University of Maryland Medical Center to be the Medical Director of the NeuroMedicine ICU and Program. He completed his fellowship training in neurocritical care at the Johns Hopkins Hospital in 2010. He completed additional fellowship training in Trauma and Surgical Critical Care at the R. Adams Cowley Shock Trauma Center, where he subsequently was a critical care attending physician in the Trauma, Neuro and Medical ICUs. He has extensive experience in critical care and strongly espouses the idea that the NeuroMedicine ICU is an ICU first and then a Neuro ICU.

Dr. Amrendra Miranpuri serves as the Surgical Co-Director of the NMICU. He completed a fellowship in Cerebrovascular Surgery from the University of Wisconsin Health System. He functions as an attending physician for the Neurosurgery team, Endovascular Neurosurgical team, and the NeuroMedicine Critical Care Team. He is actively involved with the unit building, educational, and research activities.

Attending physicians in the NMICU also include Dr. Michael Apostolakos, Dr. Peter Papadakos, Dr. Catherine Nelson, Dr. Naveen Kukreja, Dr. Laura McElroy, and Dr. Paritosh Prasad. Each attending physician brings a unique background to the neurocritical care team, ranging from anesthesia-critical care to trauma and surgical critical care.

The provider team also includes a group of very enthusiastic and motivated advanced practice providers (APPs). They include Christopher Montanaro, PA-C as the lead APP, George Heeks, ACNP, Kathryn Zelazny, PA-C, Erin Bordley, PA-C, Erin Muthig, PA-C, and Valerie Carpenter, PA-C. Samantha Delibert, PharmD functions as the team’s staff pharmacist and rounds daily with the team. She is the newest member of our team and is actively involved with protocol development and education.

Jamie Fodness, RN is the unit’s Nurse Manager and is ably assisted by the Nursing Leadership team of LaShaunda Bradley, RN, Lisa Kemp, RN, and Andrea Beyette, RN. The unit has dedicated respiratory therapists (Rudolph Koch, Timothy Middlemiss, and Jennifer Ziccarelli), a nutritionist (Kim Pelletier), physical and occupation therapists, speech and language pathologists (Andrea Perkins, Jamie Campeau, and Jackie Hynson), and our own social worker (Betty Rosabal).

Resident physicians from the Neurosurgery, Neurology, and Anesthesiology Departments rotate through the NMICU, learning neurocritical care medicine and bedside procedures from the NMICU attending and APP staff.

The NMICU is unique throughout the URMC for instituting nursing-led rounds aka “Hopkins-style” rounds. Catherine Schmieder, RN has spearheaded this project in conjunction with Dr. Markandaya. This style of rounding has been shown to engage every member of the team, facilitate order entry, reduce the risk of medication error, challenge the APPs and resident physicians to think more critically, and affords the opportunity to incorporate patients and their families in rounds.

The NeuroMedicine Critical Care Team has positively affected critical care medicine at URMC, creating hospital-wide protocols that include, but are not limited to, cerebral herniation, status epilepticus, and use of temperature management protocols including anti-shivering protocols. We are spearheading the next steps towards incorporating multi-modality monitoring for our sicker patients, and use of extra-corporeal therapies. We are also actively participating in a number of clinical trials in subarachnoid hemorrhage and status epilepticus.
URMC’s Neurocritical Care Team has rapidly expanded as we continue to care for critically ill patients in Rochester and the surrounding regions. We currently are continuing our development of unit-based and hospital-wide protocols for critical care and are developing a Neurocritical Care fellowship program. We have become the number one reason for transfer of critically ill patients to the University of Rochester Medical Center within a span of one year. We strive continuously to remain on the cutting edge of critical care through our dedication to teaching, research and, above all, to our patients and their families.

The Featured Program column seeks to enrich the outlook of NCS members by highlighting programs that are undertaking innovative approaches to the practice of neurocritical care. If you are interested in contributing an article, please contact me at rgeocad1@jhmi.edu. In this issue, we feature the expanding neurocritical care program at the University of Rochester Medical Center.

- Romergyko Geocadin, MD, Section Editor

A newly renovated, state of the art Neuro ICU room at the University of Rochester Medical Center

NeuroMedicine ICU providers, from left to right: Erin Muthig, PA-C, Valerie Carpenter, PA-C, Christopher Montanaro, PA-C, Manjunath Markandaya, MD, George Heeks, ACNP, Kathryn Zelazny, PA-C, and Erin Dragon PA-C
# Job Opportunities

**NEUROCRITICAL CARE CLASSIFIEDS**

**Job Opportunities**

(as of August 13th, 2014)

For full details on all available positions including position descriptions, applicant requirements and further contact information, visit our website at [http://www.neurocriticalcare.org/jobs/job-opportunities](http://www.neurocriticalcare.org/jobs/job-opportunities).

### International

- **Neurocritical Care Specialist—Saudi Arabia**
  - Send CV to: jsamudio@kfmc.med.sa

### Arizona

- **Neurocritical Care/Stroke Physician—John C. Lincoln North Mountain Hospital**
  - Send resume to: Joan.kilmartin@jcl.com

### California

- **Assistant or Associate Professor, Division and Stroke Center - San Diego - University of San Diego, School of Medicine**
  - Apply online at: [https://apol-recruit.ucsd.edu/apply/IPF00375](https://apol-recruit.ucsd.edu/apply/IPF00375)

- **APRN/PA Opportunity - New Haven - Yale - New Haven Hospital, Neuroscience**
  - Apply online at: [http://yalenewhavenhospitalcareers.org/91](http://yalenewhavenhospitalcareers.org/91)

- **Neurointensivist - New Haven - Yale Medical School & Yale-New Haven Hospital**
  - Send resume to: kevin.sheth@yale.edu and david.greer@yale.edu

### Connecticut

- **Neurointensivist - Wilmington - Christiana Care Health System**
  - Send resume to: abird@christianacare.org

### Delaware

- **Neurointensivist - MedStar Washington Hospital Center - MedStar Washington Hospital Center**
  - Send resume to: Brian Lee, MD at brian.g.lee@medstar.net

### District Of Columbia

- **Neurointensivist - MedStar Washington Hospital Center - MedStar Washington Hospital Center**
  - Send resume to: Brian Lee, MD at brian.g.lee@medstar.net

### Florida

- **BC/BE Neurocritical Care Physicians – Baptist Medical Center**
  - Send resume to: Angelique.Wright@gmcjax.com

- **Neurointensivist—Florida Hospital Physicians Group**
  - Send resume to: Dianne.Christian@ahss.org

- **Neurological Services-Multiple Positions—Baptist Medical Center**
  - Contact: Kathy Baldwin, (904)-202-0557 or Dr. Chen at lochbedracon@aol.com

- **Vascular Neurologist - Tampa Bay - University of South Florida College of Medicine**
  - Send resume to: Clifton L. Gooch, MD at cgooch@health.usf.edu

### Georgia

- **Assistant or Associate Professors - Augusta - Georgia Regents University**
  - Send resume to: David C. Hess, MD at dhess@gru.edu

### Illinois

- **Assistant Professor of Neurology – University of Chicago**
  - Apply online at: [https://academiccareers.uchicago.edu/applicants/jsp/shared/position/JobDetails_css.jsp](https://academiccareers.uchicago.edu/applicants/jsp/shared/position/JobDetails_css.jsp)

- **Neurocritical Care Faculty - University of Illinois at Chicago - University of Illinois at Chicago**
  - Send resume to: jyw10@uic.edu

### Kansas

- **Neurointensivist – University of Kansas Medical Center – Neuroscience Critical Care**
  - Contact: Richard Barohn at rbarohn@kumc.edu

### Louisiana

- **General Neurologist – New Orleans**
  - Contact: Dave Duncan at dduncan@enterprisedmed.com

- **Neurocritical Care Specialist - New Orleans - Ochsner Neuroscience Institute**
  - Send resume to: profrecruiting@ochsner.org

### Maine

- **Neurointensivist – Portland - Maine Medical Center**
  - Contact: Alison Nathanson at nathaa@mainehealth.org

### Massachusetts

- **Neurointensivist – Beth Israel Deaconess Medical Center and Harvard Medical School**
  - Send resume to khanafy@bidmc.harvard.edu
### Neurointensivist – Massachusetts General Hospital
Contact: Jonathan Rosand at MGHNeurologySearch@partners.org

### Michigan
- **Neurinterventionalist - Detroit - Wayne State University**
  Send resume to: Patti Bekowies at pbeekowies@med.wayne.edu
- **Physician - Neurocritical Care - Grand Rapids - Spectrum Health Butterworth Hospital**
  Contact: Beth Brackenridge at beth.brackenridge@spectrumhealth.org

### Minnesota
- **Neurologist – Cambridge**
  Apply online at: www.allinahealth.org/careers
- **Neurocritical Care Intensivist – United Hospital**
  Apply online at: www.allinahealth.org/careers - Job Posting Number: 193BR
- **Neurocritical Care Intensivist – United Hospital**
  Apply online at: www.allinahealth.org/careers - Job Posting Number: 115BR

### Missouri
- **Critical Care Neurologist - Columbia, MO - University of Missouri – Columbia**
  Send resume to: zhangf@missouri.edu

### New Jersey
- **Acute Care Surgeon – Neptune – Meridian Health**
  Send resume to: Carol Petite at CPetite@meridianhealth.com
  Faculty Position/Department of Neurological Surgery - Newark - Rutgers University - New Jersey Medical School
  Send resume to: Charles J. Prestiagiacomo, MD, FAANS, FACS at hajarti@umdnj.edu

### New Mexico
- **Neuro Critical Care with Stroke - Albuquerque - The University of New Mexico Health Sciences Center**
  Contact: Howard Yonas, MD at HYonas@salud.unm.edu

### New York
- **Comprehensive Stroke Center – Neurocritical Care – New York**
  Contact: nagee@cejkasearch.com
- **Neurocritical Care Attending - Long Island - The Winthrop University Hospital Neuroscience Institute**
  Send resume to: M. Stecker, MD at MStecker@winthrop.org
- **Neurointensivist - State University of New York at Buffalo - State University of New York at Buffalo**
  Apply online at: HYonas@salud.unm.edu
  Patient Care - Director, Neuro Critical Care - New York City - New York-Presbyterian
  Contact: Joshua Klostermeyer at jklostermeyer@besmith.com

### North Carolina
- **Neurointensivist - Chapel Hill - Universit of North Carolina at Chapel Hill**
  Apply online at: https://uncpeopleadmin.com/postings/30758
- **Medical Director – Novant Health Neurocritical Care Unit**
  Send resume to: ecsagle@novanthealth.org

### Ohio
- **Neurointensivist – Columbus, Ohio - Riverside Methodist Hospital**
  Send resume to: Ilene Morrow at Ihlene_morrow@ohiohealth.com
- **Neurointensivist - Columbus - Riverside Methodist Hospital**
  Send resume to: Ilene Morrow at Ihlene_morrow@ohiohealth.com

### Pennsylvania
- **Advanced Practice Positions – Neuro and Trauma**
  Send resume to: Meredith Kirkpatrick@uphs.upenn.edu
- **Advanced Practice Positions – Surgical Critical Care and Neurocritical Care**
  Send resume to: Meredith.Kirkpatrick@uphs.upenn.edu

### Texas
- **Acute Care Nurse Practitioner or Physician Assistant**
  Send CV to: kiwon.lee@uth.tmc.edu
- **All Sub-Specialty Neurology Job Opportunity – University of Texas Medical Center**
  Send resume to: kiwon.lee@uth.tmc.edu
- **Attending Physician – Texas Stroke Institute**
  Contact: Joshua.hunter@hcahealthcare.com
- **Interventional Neurologist – Dallas**
  Contact: dduncan@enterprisemed.com
- **Neurointensivist - Galveston - University of Texas Medical Branch**
  Send resume to: John Sealy at anbhardw@utmb.edu
- **Neurohospitalist - Abilene - Hendrick Medical Center**
  Contact: John McMahon at jmcmahon@hendrick.org
- **Neurocritical Care Specialist - El Paso - Texas Tech University Health Sciences Center**
  Apply online at: http://jobs.texastech.edu/
<table>
<thead>
<tr>
<th>Location</th>
<th>Position</th>
<th>Contact Information</th>
</tr>
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<tbody>
<tr>
<td>Utah</td>
<td>BC/BE Neurocritical Care Specialist— Intermountain Medical Center</td>
<td>Send CV to: Wilf Rudert 36 S. State Street, 21st Fl Salt Lake City, UT 84111</td>
</tr>
<tr>
<td></td>
<td>Neurocritical Care Physician – Intermountain Medical Group</td>
<td>Contact: Deanna Grange at <a href="mailto:physicianrecruitment@imail.org">physicianrecruitment@imail.org</a></td>
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<tr>
<td></td>
<td>Neurohospitalist - Salt Lake City - Intermountain Healthcare Medical Group</td>
<td>Contact: Intermountain Healthcare, Attn: Wilf Rudert at <a href="mailto:PhysicianRecruit@imail.org">PhysicianRecruit@imail.org</a></td>
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<td>Vermont</td>
<td>Neurointensivist Opportunity – Fletcher Allen Health Care</td>
<td>Send resume to: <a href="mailto:jeff.guarnera@themedicusfirm.com">jeff.guarnera@themedicusfirm.com</a></td>
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<tr>
<td>Virginia</td>
<td>Neurohospitalist - Assistant/Associate Professor - Charlottesville - University of Virginia</td>
<td>Apply online at: Job Posting 061052, <a href="https://jobs.virginia.edu/">https://jobs.virginia.edu/</a> or <a href="http://www.click2apply.net/q26xwkm">http://www.click2apply.net/q26xwkm</a></td>
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<tr>
<td>Washington</td>
<td>BE/BC Neurologist - Richland - Kadlec Health System</td>
<td>Contact: Julie Chavez at <a href="mailto:julie.chavez@kadlec.org">julie.chavez@kadlec.org</a></td>
</tr>
<tr>
<td></td>
<td>Sleep Medicine and Stroke Neurologist – Tacoma</td>
<td>Contact: <a href="mailto:dduncan@enterprisemed.com">dduncan@enterprisemed.com</a></td>
</tr>
<tr>
<td>Wisconsin</td>
<td>Neurohospitalist/Acute Care Neurology Physician</td>
<td>Contact: <a href="mailto:krasselt.lavonne@marshfieldclinic.org">krasselt.lavonne@marshfieldclinic.org</a></td>
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<tr>
<td></td>
<td>Dynamic Practice Opportunity for Neurology Specialists &amp; Sub Specialists - Milwaukee</td>
<td>Apply online at: <a href="http://www.click2apply.net/3wtmx23">http://www.click2apply.net/3wtmx23</a></td>
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<tr>
<td>California</td>
<td>Neurocritical Care Fellowship Program – CPMC</td>
<td>Contact: <a href="mailto:chencha@sutterhealth.org">chencha@sutterhealth.org</a></td>
</tr>
<tr>
<td></td>
<td>Neurocritical Care Fellowship Program - Stanford</td>
<td>Contact: Haihong Nguyen at <a href="mailto:haihongn@stanford.edu">haihongn@stanford.edu</a></td>
</tr>
<tr>
<td>Colorado</td>
<td>Neurocritical Care Fellowship Program – University of Colorado Denver Dept. of Neurosurgery</td>
<td>Send resume to: <a href="mailto:krystin.martinez@ucdenver.edu">krystin.martinez@ucdenver.edu</a></td>
</tr>
<tr>
<td>Connecticut</td>
<td>ICU-EEG Fellowship – New Haven</td>
<td>Contact: Lawrence Hirsch at <a href="mailto:lawrence.hirsch@yale.edu">lawrence.hirsch@yale.edu</a></td>
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<td></td>
<td>Yale New Haven Hospital Neurocritical Care Fellowship - New Haven</td>
<td>Contact: Kevin Sheth, MD FAHA at <a href="mailto:cathycorso@yale.edu">cathycorso@yale.edu</a></td>
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<tr>
<td>Illinois</td>
<td>Neurocritical Care Fellowship - Chicago</td>
<td>Contact: Danielle Hill, MBA at <a href="mailto:Danielle.C.Hill@rush.edu">Danielle.C.Hill@rush.edu</a></td>
</tr>
<tr>
<td>Maryland</td>
<td>Neurocritical Care Fellowship - Baltimore</td>
<td>Contact: Neeraj Badjatia, MD MS FCCM at <a href="mailto:nbadjatia@umm.edu">nbadjatia@umm.edu</a></td>
</tr>
<tr>
<td>Missouri</td>
<td>Neurocritical care fellowship at Washington University - St. Louis</td>
<td>Contact: Rajat Dhar, MD at <a href="mailto:dharr@wustl.edu">dharr@wustl.edu</a></td>
</tr>
<tr>
<td>New York</td>
<td>Neurocritical Care Fellowship</td>
<td>Contact: Errol Gordon at <a href="mailto:errol.gordon@mountsinai.org">errol.gordon@mountsinai.org</a></td>
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For full details on all available fellowships including descriptions, applicant requirements and further contact information, visit our website at www.neurocriticalcare.org/jobs/fellowship-opportunities.